RESEARCH COMMUNICATION

Lymphomas in Golestan Province of Iran: Results of a Population-based Cancer Registry

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Abstract

Introduction: Malignancies of lymphoid cells can be divided into Hodgkin and non-Hodgkin lymphomas (NHL) on the basis of pathologic features, clinical manifestations and treatment. In this paper we present data on lymphomas in Golestan province, in the northeast of Iran, during 2004-2006, using three years results of the Golestan population-based cancer registry (GPCR), a voting member of the International Association of Cancer Registries (IACR). Methods: GPCR started collecting data on all cancers from all public and private diagnostic and therapeutic centers (hospitals, specialist physicians' offices, pathology, laboratory, and imaging centers) of Golestan province in 2004. Here, we used the Iranian national census data to identify the population characteristics of this geographical area. The last census was done in 2006 and the next one will be done in 2011. The population data for years between the national census intervals are retrieved from provincial census done annually by health deputy of Golestan University of Medical Sciences (GOUMS). Results: A total of 5,076 cancer cases were diagnosed in the GPCR between 2004 and 2006. Of these, 237 (4.67 %) were lymphomas, among the ten top cancers of this area, the patients having a mean (±SD) age of 45.2 (±20.9) years. The number of cases, frequency, age specific rates, crude rates and age standardized incidence rates (ASR) (per 100,000 person-years) for lymphomas in males and females are presented. Conclusion: It could be concluded that according to available therapies for HL and NHL, the outcome of the patients could be improved in this area, due to the better diagnostic and therapeutic methods now available.

Keywords: Incidence data - lymphoma - Golestan - Iran

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Introduction

Cancer in all forms causes 9% of deaths throughout the world. In the developed countries it is the second cause of death and in the developing countries it is ranked as the fourth cause of death. In Iran, cancer ranks as the third cause of death. Geographical, racial and habitual differences have led to the variation in the incidence of cancer in different regions of this country. The second most prevalent types of cancer in Iran are lymphoma and leukemia (L&L). The estimated incidence of L&L in 1952 was 0.66 per 100,000 population and 5.9/100,000 during 1987-2003 in Mazandaran province (the highest incidence rate was observed in Babol (7.29) and the least was equally calculated in Neka and Tonekabon (1.47) (Tahmasebi et al., 2008).

Lymphoma is the third most common cancer among children in USA, with an annual incidence of 15 per million children < 14 yr of age (Cairo and Bradley, 2007). Lymphomas are malignancies of the lymphoid cells and can be divided into Hodgkin and non-Hodgkin lymphomas (NHL) regarding with the basis of pathologic features, clinical manifestations and treatment. The latter is an umbrella designation for at least 30 types of distinct B- and T-cell neoplasms. Although it was recently determined to be a B-cell lymphoma, Hodgkin lymphoma or Hodgkin's disease differs substantially from other lymphomas with respect to epidemiologic and survival characteristics. Altogether, NHLs are substantially more common and, when grouped together as a single entity, represent one of the top five sources of cancer morbidity and mortality in the US population (Clarke and O'Malley). The incidence of NHL and the pattern of expression of the various subtypes differ geographically. T cell lymphomas are more common in Asia than in western countries, while certain subtypes of B cell lymphomas such as follicular lymphomas are more common in western countries (Armitage and Longo, 2005). NHLs are also a growing component of the cancer burden; incidence rates increased over 80% between 1973 and 1999 as one of the most

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rapid increases observed among all cancers (Clarke and O'Malley). NHL accounts for approximately 60% of all lymphomas in children and adolescents. It represents 8-10% of all malignancies in children between 5-19 yr of age, with an annual incidence of 750-800 cases per year in USA in children < 19 yr of age. Although >70% of patients present with advanced disease at diagnosis, the prognosis has improved dramatically, with survival rates of 90-95% for localized disease and 60-90% with advanced disease (Cairo and Bradley, 2007). The estimated incidence of 10.2 cases per 1,000,000 children-years {95% Confidence Intervals (CI), 8.4-12.1} in Greece is around the average figure in countries of the European Union (Petridou et al., 2007). In Berlin-Frankfurt-Münster during 1986-2002 only 20 (1%) infants with NHL was identified (Mann et al., 2007). Some of the rapid increase in NHL incidence can be attributed to improvements in diagnostic practice and disease classifications, as well as to the HIV epidemic, as NHL is at least 100-times more likely to occur in the context of HIV-related immunosuppression. However, other reasons for the increasing incidence remain unclear. Overall, more than half of the patients diagnosed with NHL survive five years after diagnosis. Age influenced survival strongly as older persons typically experienced poorer survival, and even within stage, older persons had lower survival rates. Although, NHL incidence rates were higher in males than females across the age spectrum and females had slightly higher survival rates. As with most cancers, stage at diagnosis exerted considerable impact on survival. The presence of B-symptoms (B-symptoms mean the constitutional symptoms like fever, chills and weight loss) dramatically lowered survival within all stage and age groups (Armitage and Longo, 2005). Hodgkin Lymphoma (HL) is a cancer of the lymphoid cells with which an estimated 7,800 persons are diagnosed each year in the United States (American Cancer Society, 2006). Although it is a relatively rare cancer in the general population, it is one of the most common cancers diagnosed in young persons. A hallmark feature of HL epidemiology is its bimodal age-specific incidence pattern, in which incidence is highest between the ages of 15 and 34 years, declines between ages 35 and 54 years and increases again after the age of 55 years (Clarke et al). HL is a malignant process of the lympho-reticular system that constitutes 6% of childhood cancers. In the USA, HL accounts for about 5% of cancers in persons< 14 yr of age and for about 15% in 15-19 yrs-olds. It is rare in children<10 yr of age (Cairo and Bradley, 2007). In developed nations, HL is rare in <5-year olds and represents a minority in developing countries (Belgaumi et al., 2008). HL is more common in whites than in blacks and more common in males than in females (Armitage and Longo, 2005).

In this paper we will present the data of lymphomas in Golestan province, northeast of Iran, during 2004-2006, using the three years results of the Golestan population based cancer registry (GPCR) (Semnani et al., 2005). GPCR has been known as a voting member of the international association of cancer registries (IACR) (Semnani et al., 2008).

Materials and Methods

GPCR has started data gathering from 2004. It is a population based cancer registry. In the other hand, we collect data on all cancers from all public and private diagnostic and therapeutic centers (hospitals, specialist physicians' offices, pathology, laboratory, and imaging centers) of Golestan province, Northeast of Iran. We use the Iranian national census data to identify the population characteristics of this geographical area. The last census was done in 2006 and the next one will be done in 2011. The population data for years between the national census intervals are retrieved from provincial census done annually by health deputy of Golestan University of Medical Sciences (GOUMS).

We use two kinds of questionnaires, the first for outpatient and the second for inpatient cases. These questionnaires have been prepared based on IACR standards. Items collected in GPCR are consisted of the patient's demographic characteristics (first name, last name, father's name, sex, age, ethnicity, marital status, address and phone number), anatomical site of cancer, histology of tumor, method of diagnosis, date of diagnosis, method of treatment and outcome (date of death).

In some centers the data are collected passively i.e., notifications of diagnosed cases are sent to the registry on a routine, continuing basis. In these centers, an expert healthcare worker was selected and participated in professional workshops to learn how to collect requested data. Data collection in other centers is active, that means the registry stuffs regularly visit them and get information of cancer cases. Usually 10% of questionnaires are checked and compared with original documents in the referral centers to see if the abstraction process was accurate and complete. We regularly get information of cancer related deaths from death registry of health department of GOUMS and match this data with the file of registered cancer patients to identify unreported cases (Death Certificate Only or DCO cases).

We use the third edition of International Classification

Table 1. Characteristics of Patients with Lymphoma in Golestan Province of Iran during 2004-2006

Variable	Number	Percent
Sex		
Male	157	66.2
Female	80	33.8
Place of residence		
Urban	174	73.42
Rural	63	26.58
Age groups (years)		
<10	7	3.0
10-19	29	12.2
20-29	28	11.8
30-39	31	13.1
40-49	32	13.5
50-59	43	18.1
60-69	27	11.4
>70	40	16.9
Method of diagnosis		
Clinical only	1	0.4
Para-clinical	4	1.7
Histology	232	97.9

Table 2. Number of Cases, Frequency, Age Specific Rates, Crude Rates and Age Standardized Incidence Rates (ASR) (per 1000000 Person-years) for Lymphomas in Golestan Province of Iran, Males, 2004-2006

ICCC	Number	Percent	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Crude	ASR
Hodgkin Lymphoma	44	28.0	0.7	1.9	1.4	3.1	0.5	8.2	2.8	1.8	2
Non-Hodgkin Lymphoma	113	72.0	1.3	1.7	2.6	2.1	13.7	18.4	29.4	4.6	6.4
Total	157	100	2	4	4	5	14	27	32	6.4	8.4

Table 3. Number of Cases, Frequency, Age Specific Rates, Crude Rates and Age Standardized Incidence Rates (ASR) (per 1000000 Person-years) for Lymphomas in Golestan Province of Iran, Females, 2004-2006

ICCC	Number	Percent	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Crude	ASR
Hodgkin Lymphoma	22	27.5	0	1.3	1.2	1.4	0.5	3.8	0	0.9	0.9
Non-Hodgkin Lymphoma	58	72.5	0.3	1	1.7	3.1	3.1	14.2	13.3	2.4	3.3
Total	80	100	0	2	3	5	4	18	13	3.3	4.2

of Childhood Cancer (ICCC-3), coding system, which applies the rules, nomenclature and codes (morphology, topography, and behavior) of the third edition of the International Classification of Diseases for Oncology (ICD-O-3). IARC multiple primary rules(11) are used for patients with malignant tumors in more than one site.

Data are entered into CanReg-4 software, created and published by IARC. Finally, numbers of cases by sex, age and primary site as well as age standardized incidence rates (ASR) and mortality rates for all cancers are calculated and reported annually.

Results

Totally 5076 cancer cases were diagnosed in GPCR between 2004 and 2006. Of these, 237 (4.67 %) were lymphomas with mean (±SD) age of 45.22 (±20.94) years. Lymphoma was among the ten top cancers of this area. Table 1 shows the characteristics of patients with lymphoma in Golestan province during 2004-2006. Number of cases, frequency, age specific rates, crude rates and age standardized incidence rates (ASR) (per 1000000 person-years) for lymphomas in males and females are shown in Tables 2 and 3, respectively.

Discussion

According to the results, lymphoma was among the first ten cancers diagnosed in both genders during this 3-years-period (eighth in men and tenth in women).

As seen in Table 2 and 3, ASRs of lymphomas (NHL and HL) were 8.4/ 100000 and 4.2/100000 in males and females, respectively. Other studies in the Mazandaran province (neighboring province of Golestan) reported an ASR of 5.9/100000 during 1987-2003 which showed an increase from 0.66/100000 in 1952 in that area (Tahmasebi et al., 2008). In comparison to the whole country, lymphoma is ranked lower in our area and its prevalence in males seems to be higher compared to the next door province. Both NHL and HL have a higher age specific incidence rate in males compared to females of Golestan province.

Other reports documented this predominance in male and they also reported a higher survival rate in women (Armitage and Longo, 2005; Clarke et al). Similar to other studies (Clarke et al), HL had two peak rates, one between 15-34 years age group and the other in cases older than 55-years-old. Despite its relatively low level of occurrence and high curability, it is the propensity of HL to occur in the productive years of life that makes it a significant source of cancer-related morbidity and mortality in the US (Mauch et al., 1993).

In our studied cases, children 0-14-years-old had the lowest ASR of both HL and NHL among all age groups (2/100000 in males and 0 in females). NHL has an annual incidence of 750-800 cases per year in USA and an estimated incidence of 10.2 cases per 1000000 children-years in Greece (Cairo and Bradley, 2007; Petridou et al., 2007).

HL is reported rare in <5-year olds in developed nations and represents minority in developing countries (Cairo and Bradley, 2007; Belgaumi et al., 2008). Several probable risk factors are mentioned for lymphoma, some are as followings: genetic susceptibility (Pang et al., 2008), long-term use of tricyclic antidepressants (Dalton et al., 2008), blood transfusions and chronic diseases as Rheumatoid Arthritis (Cerhan et al., 2008; Smitten et al., 2008), large sib ship size, late birth order, and childhood crowding (Smedby et al., 2007). In contrast better hygiene and sanitation, decreasing family size, sun exposure of children (Petridou et al., 2007) and high dietary intake of vitamin D can decrease the incidence of non-Hodgkin lymphoma (NHL) around the world (Armstrong and Kricker, 2007). It is clear that most of these risk factors are preventable. HL is also notable among other cancers for the availability of curative therapy, which has resulted in relatively favorable outcomes; the rate of one-year relative survival for HL was generally favorable at 92% in other studies (Clarke et al.; Ries et al., 2006).

Here we could not retrieve stages of the disease and related survival rate, thus other detailed researches are suggested to follow cases diagnosed with lymphoma and assess the related risk factors between males and females in different age groups.

Thus, it could be concluded that according to available therapies for HL and NHL, the outcome of the patients could be improved in this area, due to the better diagnostic and therapeutic methods now available in the area.

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